

Appln. No. 10/657,054

Amendment dated:

Response to Office Action dated: July 8, 2005

**Amendments to the Claims:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

**Listing of Claims:**

1. (Currently amended): A method for forming an inductor, comprising:  
forming a ceramic substrate by stacking a plurality of unfired ceramic layers  
forming in said ceramic ~~a ceramic~~ substrate a first plurality of conductive vias radially spaced a first distance from a central axis so as to define an inner circumference;  
forming in said ceramic substrate a second plurality of conductive vias radially spaced a second distance about said central axis so as to define an outer circumference;  
forming a first plurality of conductive traces disposed in a first plane defined orthogonal to said central axis, said first plurality of conductive traces forming an electrical connection between substantially radially adjacent ones of said first and second plurality of conductive vias;  
forming a second plurality of conductive traces disposed in a second plane spaced from said first plane and defined orthogonal to said central axis to define an electrical connection between circumferentially offset ones of said first and second plurality of conductive vias to define a three dimensional toroidal coil;  
wherein at least a first one of said ceramic layers has a permeability greater than one over an area that includes said entire substrate, and at least a portion of said first one of said ceramic layers is contained within a toroid shaped core region of said ceramic substrate, defined within said toroidal coil.
2. (Original): The method according to claim 1 further comprising the step of firing said ceramic substrate after said conductive vias and said traces have been formed.
3. (Canceled)
4. (Currently amended): The method according to ~~claim 3~~ claim 1, further comprising the step of selecting at least a second one of said ceramic layers to have a permeability different from said first one of said ceramic layers ~~said electrical characteristic to be a permeability.~~
5. (Canceled)
6. (Currently amended): The method according to ~~claim 3~~ claim 1 wherein said ceramic material layers are formed of ~~is~~ a low-temperature co-fired ceramic (LTCC) material.

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7. (Canceled)
8. (Canceled)
9. (Original) The method according to claim 1 further comprising the steps of :
  - forming a third plurality of conductive vias radially spaced a third distance from said central axis so as to define an second inner circumference, said third distance less than said first distance;
  - forming in said ceramic substrate a fourth plurality of conductive vias radially spaced a fourth distance about said central axis so as to define a second outer circumference, said fourth distance larger than said second distance;
  - forming a third plurality of conductive traces disposed in a third plane defined orthogonal to said central axis, said third plurality of conductive traces forming an electrical connection between substantially radially adjacent ones of said third and fourth plurality of conductive vias;
  - forming a fourth plurality of conductive traces disposed in a fourth plane spaced from said first plane and defined orthogonal to said central axis to define an electrical connection between circumferentially offset ones of said third and fourth plurality of conductive vias to define a second three dimensional toroidal coil.
10. (Original) The method according to claim 9 further comprising the step of forming an electrical connection between the first and second three-dimensional conductive toroidal coils.
11. (Original) The method according to claim 10 further comprising the step of configuring said electrical connection so that the first and second toroidal coils generate a magnetic field in a common direction.
12. – 34. (Canceled)
35. (New) A method for forming an inductor, comprising:
  - forming in a ceramic substrate a first plurality of conductive vias radially spaced a first distance from a central axis so as to define an inner circumference;
  - forming in said ceramic substrate a second plurality of conductive vias radially spaced a second distance about said central axis so as to define an outer circumference;
  - forming a first plurality of conductive traces disposed in a first plane defined orthogonal to said central axis, said first plurality of conductive traces forming an electrical connection between substantially radially adjacent ones of said first and second plurality of conductive vias;

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forming a second plurality of conductive traces disposed in a second plane spaced from said first plane and defined orthogonal to said central axis to define an electrical connection between circumferentially offset ones of said first and second plurality of conductive vias to define a three dimensional toroidal coil;

forming a third plurality of conductive vias radially spaced a third distance from said central axis so as to define an second inner circumference, said third distance less than said first distance;

forming in said ceramic substrate a fourth plurality of conductive vias radially spaced a fourth distance about said central axis so as to define a second outer circumference, said fourth distance larger than said second distance;

forming a third plurality of conductive traces disposed in a third plane defined orthogonal to said central axis, said third plurality of conductive traces forming an electrical connection between substantially radially adjacent ones of said third and fourth plurality of conductive vias;

forming a fourth plurality of conductive traces disposed in a fourth plane spaced from said first plane and defined orthogonal to said central axis to define an electrical connection between circumferentially offset ones of said third and fourth plurality of conductive vias to define a second three dimensional toroidal coil.

36. (New) The method according to claim 35 further comprising the step of forming an electrical connection between the first and second three-dimensional conductive toroidal coils.

37. (New) The method according to claim 36 further comprising the step of configuring said electrical connection so that the first and second toroidal coils generate a magnetic field in a common direction.

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